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Monthly Report

November 1987 Number 231

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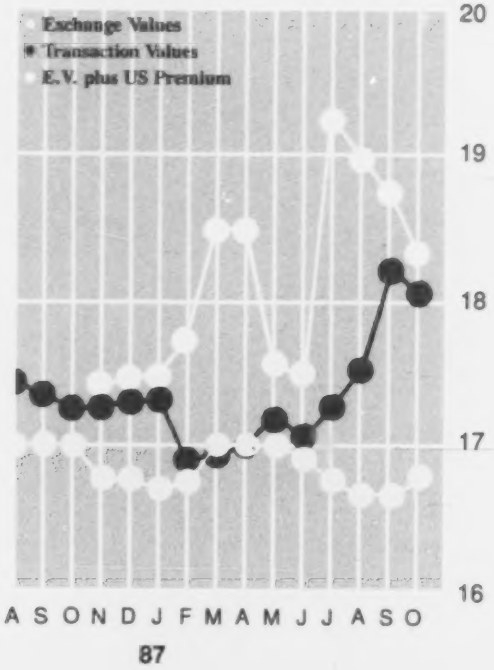

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EXECUTIVE SUMMARY
REPORT 231
(All data as of October 31, 1987)

Exchange Value $16.75, up $0.10

The **Exchange Value** is **$16.75** per pound U_3O_8, up $0.10 since last month. The US Premium (relative to the Exchange Value) is $1.65, down $0.45 since last month.

UF_6 Value $47.00, up $0.25

The **UF_6 Value** is **$47.00** per kilogram U as UF_6, up $0.25 since last month. The US Premium (relative to the UF_6 Value) is $3.10, down $1.15 since last month.

Transactions

Thirteen recent natural uranium sales are reported, involving **9.4 million** pounds equivalent U_3O_8. Eleven of the sales involved spot or near-term delivery, and ten met the conditions for inclusion in the Transaction Value. Active spot and near-term **uranium supply** amounts to **5.7 million** pounds U_3O_8 equivalent, down 700 thousand pounds since last month. Active spot and near-term **uranium demand** totals **2.0 million** pounds, up 260 thousand pounds from last month. The spot and near-term **supply-demand ratio** decreased to **2.9 to 1**.

Transaction Value $18.05, down $0.15

The **Transaction Value** is $18.05 per pound U_3O_8, **down $0.15** since last month. The calculation includes transactions involving a total of 3.7 million pounds U_3O_8 and equivalent UF_6, of which 2.0 million pounds are US-origin, and covers a period of 3 months.

Loan Rate 4%, unchanged

The **Loan Rate** is **4 percent** per annum, unchanged. Two loan transactions are reported.

Conversion Value $1.90, unchanged

The **Conversion Value** is **$1.90** per pound U as UF_6, unchanged since last month. Active secondary market supply for conversion services for delivery within three years totals 330 thousand pounds U as UF_6. Active demand totals 660 thousand pounds U as UF_6. No secondary market conversion transactions are reported.

SWU Value for delivery within one year: $69, down $4.00

The **SWU Value** at .3% tails assay and for delivery within one year is **$69** per SWU, down $4.00 since last month. No secondary market SWU transactions are reported.

* * *

Raw Materials

Although current regulations covering uranium tailings affect the design and operation of today's mills, numerous now-inactive uranium milling sites operated for many years without regulation. This article examines how current laws and regulations are being applied to the cleanup and stabilization of uranium tailings sites throughout the USA.

Australia

For some time, the Australian government has been under pressure to change its floor-price policy and its "three-mine" policy. This article discusses how both policies may be undergoing significant changes that could greatly affect Australia's position among uranium producers.

South Africa

Third-quarter 1987 output from Chamber of Mines producers declined 14.5 percent, largely the result of drops in production at Randfontein and Vaal Reefs, which were adversely affected by the mineworkers strike in August.

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NUEXCO REPORT 231 FIGURES OF THE MONTH (October 31, 1987)	This Month (Report 231)	Last Month (Report 230)	12 Months Ago (Report 219)
Exchange Value ($US per pound U_3O_8)	16.75	16.65	17.00
US Premium for the Exchange Value ($US per pound U_3O_8)	1.65	2.10	—
UF_6 Value ($US per kilogram U as UF_6)	47.00	46.75	48.00
US Premium for the UF_6 Value ($US per kgU as UF_6)	3.10	4.25	—
Transaction Value ($US per pound U_3O_8 equivalent)	18.05	18.20	17.25
Loan Rate (Per Annum)	4%	4%	4%
Conversion Value ($US per pound U as UF_6)	1.90	1.90	1.90
Near-Term Uranium Supply[1] (millions of pounds U_3O_8)	5.7	6.4	3.7
Near-Term Uranium Demand[2] (millions of pounds U_3O_8)	2.0	1.7	0.9
Near-Term Supply-Demand Ratio	2.9	3.7	2.9
Recent Uranium Sales:[3]			
Number of Transactions	13	9	6
Quantity of Material (Millions of pounds U_3O_8 equivalent)	9.4	19.2	1.0
Nuexco SWU Value: ($US per SWU)[8]			
at 0.3 tails assay ($US per SWU)	69	73	78
US DOE SWU Prices: ($US per SWU)			
USEC	117.00	119.00[4]	119.00[5]
AFC	153.00	153.00[6]	153.00[6]
Requirements	157.00	157.00[6]	157.00[6]
Incentive Price	90.00	90.00[7]	—
Market Value of Enriched UF_6[8]: ($US per kgU as UF_6)			
2.5 w/o U_{235}	432	441	460
3.0 w/o U_{235}	551	563	591
3.5 w/o U_{235}	673	688	723
4.0 w/o U_{235}	796	814	858

[1]Active inquiries to sell, for delivery within 12 months after contract signing.

[2]Active inquiries to purchase, for delivery within 12 months after contract signing.

[3]Uranium sales only; does not include loans, conversion, or SWU transactions.

[4]Effective since 10/1/86.

[5]Effective since 10/1/85.

[6]Effective since 10/1/84.

[7]Effective since 10/1/86, for up to 30% of annual requirements.

[8]Calculated using the Nuexco Exchange Value, Conversion Value, SWU Value and 0.30 percent tails assay.

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

November 1987 No. 231

R. GENE CLARK, *EDITOR* CHARLES B. LEWIS, *ASSISTANT EDITOR*

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To Our Readers

* * *

Nuexco's George White (on the right), accompanied by his 21-year old son, Walker, is shown over southern California delivering the Nuexco Monthly Report to an out-of-the-way subscriber. Walker's new responsibilities, after his earlier stint designing and implementing Nuexco's database management system, reflect our increasing commitment to improved customer service.

The definition of the SWU Value has been clarified this month to delete references to specified origin and to bring the delivery period in line with the other Nuexco market values.

* * *

In the *Historical Market Data* section of the Report we have added year 1986 statistics which became available this month.

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CURRENT MARKET DATA

October 31, 1987	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$16.75**/lb. U_3O_8	5,735	1,985
US Premium	**$1.65**		
UF_6 VALUE	**$47.00**/kgU		
US Premium	**$3.10**		
CONVERSION VALUE	**$1.90**/lb. U as UF_6	330	660
SWU VALUE			
0.3 tails assay:	**$69**/SWU	550	180
LOAN RATE	**4%**/annum	1,100	0

TRANSACTION VALUE	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
	18.05	**3.7**	**17**	**3**

[1]Supply and demand tables in the *Current Market Data* section of this Report detail the numbers for each category.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.
5. The **Loan Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

   The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.
7. **The US Premium** is Nuexco's judgment of the incremental price (relative to the Exchange Value or UF_6 Value, as applicable) at which transactions for significant quantities of natural uranium could be concluded as of the date indicated, if the buyer will accept only US-origin.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed awillingness to accept, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these Market Values.
3. In the determination of prices, Nuexco does not consider transportation charges other than those customarily provided by suppliers .
4. The prices of services or materialss delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.
5. For the SWU Value, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight percent U_{235} and a product assay of 3.0 weight-percent U_{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of October 31, 1987)

The **Exchange Value** is **$16.75** per pound U_3O_8, up $0.10 since last month. US-origin uranium is commanding a **premium** (relative to the Exchange Value) of **$1.65** per pound U_3O_8 (down $0.45) in the form of concentrates, and $3.10 per kilogram U (down $1.15) in the form of UF_6. **Active supply** of natural uranium (concentrates and UF_6) for spot or near-term delivery totals **5,735,000** pounds U_3O_8 equivalent, down 700,000 pounds since last month. The corresponding figure for **active demand** is **1,985,000** pounds, up 260,000 pounds. The spot and near-term supply-demand ratio decreased to 2.9 to 1.

The Current Market Data section of this Report lists thirteen natural uranium sales, totaling 9.4 million pounds U_3O_8 equivalent.

The **Transaction Value** is $18.05 per pound U_3O_8, down $0.15 since last month. The calculation extends over a 3-month period and includes 17 transactions involving 3.7 million pounds equivalent U_3O_8.

The **UF_6 Value** is $47.00 per kilogram U in UF_6, up $0.25 since last month. Nine transactions involving UF_6 are reported, totaling approximately 2.3 million pounds equivalent U_3O_8.

The **Conversion Value** is $1.90 per pound U as UF_6, unchanged since last month. Active supply of secondary market conversion services totals 330 thousand pounds U as UF_6. Active demand totals 660 thousand pounds U as UF_6. No secondary market conversion transactions are reported.

The **Loan Rate** is 4 percent per annum, unchanged since last month. Two loan transactions are reported.

* * *

The Exchange Value is $16.75 per pound U_3O_8, up $0.10 since last month. The announcement on October 4, 1987 of a Free Trade Agreement between the USA and Canada restored a measure of confidence to sellers of Canadian uranium, some of whom are active suppliers in the near-term market. If approved and implemented in its present form by the USA and Canada, the Free Trade Agreement will exempt Canadian uranium from US restrictions on the enrichment of non-US-origin uranium for use by US utilities, and it will exempt Canadian exports to the USA from the Canadian government's requirement that natural uranium be exported from Canada in the form of UF_6. Implementation of those conditions would be likely to reduce substantially or even or eliminate the price difference between US and Canadian-origin uranium in North America.

The Premium (relative to the Exchange Value) for US-origin U_3O_8 declined $0.45 this month, to $1.65 per pound U_3O_8. The announcement of the US-Canada trade agreement, and the October 8 issuance of a stay of the injunction prohibiting DOE from enriching non-US-origin uranium for US utilities, have made US utilities more reluctant to pay a premium under current market conditions.

Some sellers of US-origin concentrates have lowered their offering prices and others are considering doing so. Sellers' stocks of US uranium have grown over the past year as many US producers have stockpiled material in anticipation of a protected domestic market. Some sellers may now be considering liquidating those stocks on the chance that the premium for US-origin might disappear altogether. Nevertheless, a number of US producers remain optimistic that the Free Trade Agreement will not be ratified in its current form, and that the producers' lawsuit ultimately will be resolved in favor of the producers.

The *Current Market Data* section of this Report lists two spot or near-term U_3O_8 transactions, totaling approximately 650,000 pounds U_3O_8. Both of those transactions, however, were completed before the US-Canada Free Trade Agreement was announced early in October. One of those sales involved a significant quantity of natural uranium concentrates sold by a Canadian producer to a US utility at a price evaluated to be above last month's Exchange Value. In addition, two long-term U_3O_8 transactions are reported, involving approximately 7 million pounds U_3O_8 bought by a US utility from non-US suppliers. Both of these occurred earlier in the year.

The UF_6 Value is $47.00 per kgU as UF_6, up $0.25, reflecting a general strengthening of the market for non-US-origin material. The Premium (relative to the UF_6 Value) for US-origin UF_6 declined $1.15 to $3.10 per kgU. Nine spot and near-term UF_6 transactions are reported, involving approximately [illegible] million pounds U_3O_8 equivalent, of which approximately 850,000 pounds equivalent were of US origin. All the reported UF_6 transactions involved intermediaries, and most of those transactions took place before the early October announcements of the

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Appeals Court's stay of the injunction following from its earlier ruling against DOE, and the Free Trade Agreement with Canada.

In North America, at least four utilities are evaluating long-term supply proposals, and at least two other buyers have expressed interest in spot purchases; at this time US buyers are expressing interest in both US and non-US-origin uranium, and Canadian-origin has become the preferred non-US-origin since the announcement of the FTA. One large non-US buyer has expressed interest in making a spot purchase, and another European utility is evaluating long-term offers. Few European utilities have uncovered requirements for 1987 delivery at this time, and spot market buying activity is not expected to increase again until 1988.

* * *

The Loan Rate is 4 percent per annum, unchanged since last month. Two loan transactions are reported this month. Natural uranium stocks are sufficient to enable borrowers in the current market to obtain material of any origin as needed, provided that appropriate security for the loan can be provided.

* * *

The Conversion Value is 1.90 per pound U as UF_6, unchanged since last month. No secondary market conversion transactions are reported. As in recent months, conversion prices in the secondary market vary widely, depending on the origin and location of the concentrates delivered by the buyer and the UF_6 delivered by the seller. Conversion transactions involving US-origin material in the USA could take place at prices near the Conversion Value, however, non-US-origin conversion transactions in the USA may command prices at or above the current Conversion Value. Secondary conversion in Europe is generally much more expensive due to the small number of UF_6 and conversion sellers, and the higher price of primary conversion in equivalent US dollars, which affects secondary market prices. At current exchange rates, primary market conversion in Europe may cost about $4 per pound U as UF_6 ($9.00 per kgU), compared to approximately $2.75 per pound U as UF_6 ($6.00 per kgU) in North America.

ENRICHED URANIUM AND SWU

The SWU Value declined $4.00 this month to $69. In recent weeks several potential buyers have reported receiving offers below the $70 per SWU level for near-term delivery. During September, one US utility purchased a significant quantity of DOE-origin SWU at a price under $70, and at the end of October another US buyer appeared close to accepting an offer for DOE-origin SWU at a price near that level. Two key factors currently influence the secondary market:

1. The liquidation of a large quantity of FY1988 DOE SWU credits is expected in coming weeks at whatever price is necessary to complete their sale. DOE has offered a substantial quantity of DOE SWU through a competitive bid process on behalf of a US utility customer, and DOE has notified all of its present and former customers of the opportunity. While several utilities do have unfilled requirements in the 1987-1988 time period, Nuexco is not aware of any that are pressed to buy at this time, and buyers' bidding prices are likely to reflect that lack of urgency to buy. Bid prices also will depend on particular preferences for DOE-origin SWU credits compared with secondary market SWU of other origins.

2. Low-priced Soviet-origin SWU are having an increasing influence on the SWU Value. A number of spot sales of Techsnabexport (TSE)-origin SWU (bought either directly or indirectly through swaps) have occurred over the past 18 months, to European buyers and even to US utilities. The prices of these sales have been consistently below the SWU Value, but Nuexco has refrained from reflecting these in the SWU Value determination because the majority of the Western world's utilities have *de facto* policies prohibiting acquisition of TSE-origin SWU. Nevertheless, the lower prices being paid clearly are exerting downward pressure on secondary prices for DOE, Eurodif and Urenco-origin SWU. Furthermore, it appears that the political opposition to TSE-origin SWU may be weakening among some utilities in North America.

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MARKET UNCERTAINTIES COMPLICATE PROCUREMENT DECISIONS

The Proposed US-Canada Free Trade Agreement

On October 4, 1987, President Reagan announced his intention to enter into a trade agreement with Canada on January 3, 1988. With respect to uranium, the agreement (as presently structured) provides:

1. That Canadian-origin uranium be exempt from any restrictions on enrichment, beginning January 1, 1989. This essentially negates Section 161(v) of the Atomic Energy Act as it pertains to Canadian uranium;
2. That the uranium upgrading requirements of Canada's Atomic Energy Control Act will be eliminated with respect to uranium exported to the USA;
3. That both countries prohibit restrictions on imports or exports of uranium from the other country, including quantitative restrictions, taxes and minimum import or export prices.

If the Free Trade Agreement (FTA) were adopted with these provisions, Canadian-origin uranium would be considered to be the same as US-origin uranium for purposes of import into the USA, a situation effectively mooting both the on-going US Producers vs. DOE lawsuit and the import-limitation portion of the Senate Energy Committee's proposed legislation.

Recent Legislative and Judicial Developments in the USA

October brought two new developments in the US Producers vs. DOE lawsuit:

1. The Tenth Circuit Court of Appeals granted, until November 7, 1987, DOE's request for a further stay of Judge Carrigan's 1986 order barring the enrichment of non-US-origin feed for use by US utilities.
2. On October 19, DOE filed its petition for a *writ of certiorari* with the Supreme Court. The filing of that petition extends the stay until the Supreme Court denies the petition (in which event the case would be remanded to Judge Carrigan, who would be expected to enforce his original order), or the Supreme Court ultimately decides the case after granting the petition for *writ of certiorari*. The final decision in the case could be handed down as late as the end of 1988.

In addition, there continues to be strong opposition to the Senate Energy Committee's proposed legislation, both in the Senate and in the House of Representatives, despite the Committee's 13 to 2 approval of the bill. This opposition focuses primarily on the enrichment enterprise restructuring provisions of the bill. At this stage, even the bill's proponents appear to have concluded, however reluctantly, that its passage is unlikely.

Timetable for the Free Trade Agreement

Between October 5, 1987, and January 2, 1988, the Executive Branch and Congress will conduct informal consultations,with the House Ways and Means Committee, the Senate Finance Committee, and with other committees that have jurisdiction over matters that the FTA would affect. The President's negotiating authority expires on January 2, 1988, and the two countries have until that date to accomodate the views of their respective legislative branches, agree on the Free Trade Agreement's final language, and sign the Agreement.

Following signing of the Agreement by President Reagan and Prime Minister Mulroney, the Agreement becomes effective only upon passage by the US Congress and Canadian Parliament of implementing legislation. The President first must submit the final full text of the FTA to Congress, along with a draft of the necessary implementing legislation, a statement of any proposed administration action to implement the Agreement, and a detailed explanation of how the implementing legislation and proposed administrative action affect existing laws. In addition, the President must submit a statement explaining how the Agreement will serve US commercial interests and why the implementing bill is required and appropriate.

Such a package will likely be submitted to Congress soon after it reconvenes in January 1988, although it need not be submitted at that time. Once it has been submitted, no amendments can be made to the FTA text or to the implementing legislation, so it is essential that any changes or compromises be made during the period before formal submission to Congress. Congress has 60 legislative days after the FTA's formal submission to vote on the proposed implementing legislation. As the implementing bill will involve revenues, such as tariffs, it is likely that an additional 30-legislative-day period will be in effect, as specified under the 1978 "fast-track" provisions of the 1974 Trade Act.

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Conclusion

Despite the uncertainties introduced by the potential Free Trade Agreement, it is possible to make some general observations concerning its current and likely future market impact:

The present situation is likely to cause most US utility buyers to put intermediate or long-term purchases on hold while the situation resolves itself. Those few utilities actually needing to purchase material for short-term requirements in the interim are likely to buy non-US-origin material on the spot market, especially while DOE continues to enrich non-US-origin feed pending the Supreme Court review of the Producers' lawsuit. Most utilities have positioned themselves for the near-term to withstand a possible 100-percent embargo of non-US-origin feed, and are relieved at the possibility of their existing Canadian contracts and inventory being considered as usable as US-origin.

If the trade agreement is adopted before final resolution of the other issues, it follows that most US utilities would undertake a renewed round of long-term contracting with Canadian suppliers for the period after 1990, despite the appearance that Canada's current production capacity and existing commitments to non-US buyers preclude a substantial near-term increase in exports to the USA. Such a scenario also could stimulate increased long-term development of uranium properties in Canada.

Another potential effect of the Free Trade Agreement, if combined with the expected producer victory in the DOE lawsuit, could be a much diminished role for Australia's uranium sellers in the US market. While it is generally believed that a *total* embargo on uranium imports would be relatively short-lived, probably due to a strong negative reaction by US utilities that would, in turn, lead to Congressional action, a selective embargo that excluded Australian but allowed Canadian-origin probably would not provoke as strong a negative reaction from US utilities. Thus, Australian producers could suffer the greatest losses from this complicated series of events.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Oct 31, 1987)	Last Month (Sep 30, 1987)	12 Months Ago (Oct 31, 1986)	This Month (Oct 31, 1987)	Last Month (Sep 30, 1987)	12 Months Ago (Oct 31, 1986)
Australia (dollar)	24.98	23.16	26.46	64.95	60.20	68.79
Belgium (comm. franc)	608.43	635.74	724.95	1,582	1,652	1,885
Canada (dollar)	22.07	21.83	23.61	57.39	56.75	61.38
EEC (ecu)	14.04	14.75	16.46	36.50	38.34	42.80
Finland (markka)	71.34	73.48	84.75	185.46	191.02	220.32
France (franc)	98.01	101.96	113.86	254.81	265.07	296.02
FRG (mark)	29.03	30.63	34.85	75.47	79.64	90.60
Italy (lira)	21,006	22,112	24,107	54,610	57,485	62,672
Japan (yen)	2,318	2,437	2,742	6,027	6,335	7,128
Netherlands (guilder)	32.69	34.48	39.43	84.98	89.64	102.52
South Africa (rand)	33.53	34.51	38.64	87.18	89.71	100.45
Spain (peseta)	1,952	2,026	2,334	5,075	5,268	6,068
Sweden (krona)	103.97	107.07	119.13	270.31	278.37	309.71
Switzerland (franc)	24.04	25.46	28.90	62.50	66.19	75.14
UK (pound)	9.76	10.22	12.12	25.37	26.58	31.51
US (dollar)	16.75	16.65	17.00	43.55	43.29	44.20

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Oct 31, 1987)	Last Month (Sep 30, 1987)	12 Months Ago (Oct 31, 1986)	This Month (Oct 31, 1987)	Last Month (Sep 30, 1987)	12 Months Ago (Oct 31, 1986)
Australia (dollar)	26.92	25.31	26.85	69.99	65.81	69.80
Belgium (comm. franc)	655.65	694.92	735.61	1,705	1,807	1,912
Canada (dollar)	23.79	23.86	23.96	61.84	62.03	62.28
EEC (ecu)	15.13	16.12	16.80	39.33	41.91	43.68
Finland (markka)	76.87	80.32	85.99	199.85	208.81	233.56
France (franc)	405.62	111.45	115.54	274.58	289.75	300.38
FRG (mark)	31.28	33.49	35.36	81.33	87.06	91.94
Italy (lira)	22,636	24,170	24,461	58,849	62,837	63,594
Japan (yen)	2,498	2,664	2,782	6,495	6,925	7,223
Netherlands (guilder)	35.23	37.69	40.01	91.58	97.98	104.03
South Africa (rand)	36.14	37.72	39.20	93.95	98.06	101.92
Spain (peseta)	2,104	2,215	2,369	5,469	5,758	6,158
Sweden (krona)	112.04	117.04	120.88	291.28	304.28	314.27
Switzerland (franc)	25.91	27.83	29.33	67.35	68.10	76.24
UK (pound)	10.52	11.18	12.30	27.34	29.05	31.97
US (dollar)	18.05	18.20	17.25	46.93	47.32	44.85

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on the last working day of the month indicated.

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CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6			per kg. U as UF_6		
	This Month (Oct 31, 1987)	Last Month (Sep 30, 1987)	12 Months Ago (Oct 31, 1986)	This Month (Oct 31, 1987)	Last Month (Sep 30, 1987)	12 Months Ago (Oct 31, 1986)
Australia (dollar)	2.83	2.64	2.96	6.25	5.83	6.52
Belgium (comm. franc)	69.02	72.55	81.02	152.15	159.94	178.63
Canada (dollar)	2.50	2.49	2.64	5.52	5.49	5.82
EEC (ecu)	1.59	1.68	1.84	3.51	3.71	4.06
Finland (markka)	8.09	8.38	9.47	17.84	18.49	20.88
France (franc)	11.12	11.64	12.73	24.51	25.65	28.06
FRG (mark)	3.29	3.50	3.90	7.26	7.71	8.59
Italy (lira)	2,383	2,523	2,694	5,253	5,563	5,940
Japan (yen)	262.98	278.06	306.45	579.76	613.02	675.61
Netherlands (guilder)	3.71	3.93	4.41	8.17	8.67	9.72
South Africa (rand)	3.80	3.94	4.32	8.39	8.68	9.52
Spain (peseta)	221.45	231.23	260.88	488.20	509.77	575.14
Sweden (krona)	11.79	12.22	13.31	26.00	26.94	29.35
Switzerland (franc)	2.73	2.91	3.23	6.01	6.40	7.12
UK (pound)	1.11	1.17	1.35	2.44	2.57	2.99
US (dollar)	1.90	1.90	1.90	4.19	4.19	4.19

SWU VALUE AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	SWU Value at 0.30% tails assay (Oct 31, 1987)	UF_6 Value per kg.U in UF_6 This Month (Oct 31, 1987)	UF_6 Value per kg.U in UF_6 Last Month (Sep 30, 1987)
Australia (dollar)	102.91	70.09	65.02
Belgium (comm. franc)	2,506	1,707	1,785
Canada (dollar)	90.93	61.93	61.28
EEC (ecu)	57.84	39.39	41.41
Finland (markka)	293.87	200.17	206.31
France (franc)	403.74	275.01	286.28
FRG (mark)	119.58	81.45	86.01
Italy (lira)	86,531	58,942	62,085
Japan (yen)	9,550	6,505	6,842
Netherlands (guilder)	134.66	91.72	96.81
South Africa (rand)	138.14	94.09	96.89
Spain (peseta)	8,042	5,478	5,689
Sweden (krona)	428.31	291.74	300.64
Switzerland (franc)	99.04	67.46	71.48
UK (pound)	40.20	27.38	28.70
US (dollar)	69.00	47.00	46.75

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on the last working day of the month indicated.

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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price Range as Percent of Current Exchange or UF_6 Value[2]	Seller	Buyer	Remarks
4170	1987	101-300	98—102	Producer	Intermediary	UF_6
4171	1987	less than 50	98—102	Intermediary	Utility	US-Origin UF_6
4172	1988	301-600	93—97	Producer	R[3]	UF_6
4176	1987	301-600	R[3]	Intermediary	Utility	UF_6
4177	1987	301-600	103—107	Utility	Intermediary	US-Origin
4178	1987	101-300	98—102	Producer	Intermediary	US-origin UF_6
4179	1989	101-300	98—102	Producer	R[3]	UF_6
4180	1989-98	3,001-5,000	See Comments	Producer	Utility	Market-related
4181	1989-98	3,001-5,000	See Comments	Producer	Utility	UF_6, Mkt. Rel.
4184	1987-88	101-300	98—102	Producer	Utility	
4189	1987	50-100	R[3]	Producer	Intermediary	US-Origin UF_6
4190	1988	50-100	R[3]	Producer	Intermediary	US-Origin UF_6
4194	1988	301-600	103—107	Intermediary	Utility	UF_6

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] Where US-origin material is involved, the range is based on the Exchange Value (or UF_6 Value) *plus* the premium (relative to the Exchange Value or UF_6 Value). The range reflects five percentage points (inclusive) per grouping, centered about the middle of the range.
[3] The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.

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Loan Transactions

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price Range as Percent of Current Loan Rate)	Lender	Borrower	Remarks
4186	1987	101-300	R[4]	Utility	Intermediary	UF_6
4187	1987	101-300	R[4]	Utility	Intermediary	UF_6

[1]Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2]If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.30 w/o tails assay.
[3]Prices are usually normalized to 0.30% tails assay. Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.
[4]The notation R means that Nuexco either does not know, or that Nuexco has restricted that information to protect client or source confidentiality.

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CURRENT MARKET DATA

URANIUM SUPPLY
(October 31, 1987)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
87-1002	270	—	
87-1014A*	275	—	UF_6
87-1022	40	—	
87-1023	500	500 per year	1987-90
87-1053	100	400 per year	1989 on
87-1055*	200	300 per year	1988-93
87-1091	1,000	1,000 per year	UF_6
87-1097	500	—	
87-1109	50	250 per year	1990 on
87-1120	1,000	—	
87-1123*	400	—	
87-1124	500	500 per year	1988 on
87-1130	750	—	
87-1142*	150	—	
87-1001	—	400 per year	1989 on
87-1005	—	400 per year	1988-95
TOTAL:	5,735		
INACTIVE			
87-1017	1,000	—	
87-1059	120	—	UF_6
87-1061	780	800 per year	UF_6, 1988 on
87-1130*	850	—	UF_6
87-1135*	500	—	
87-1019	—	600 per year	1988-91
87-1025	—	250 per year	1988 on
TOTAL:	3,250		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 1084C.

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URANIUM DEMAND
(October 31, 1987)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
87-1007*	150	—	
87-1030*	175	—	
87-1107	450	1,225	1990-92
87-1116	60	—	UF_6
87-1121	650	650 per year	1988-96
87-1124*	125	—	UF_6
87-1138*	175	—	UF_6
87-1140	200	—	
87-1013	—	1,200 per year	1990-95
87-1021	—	200 per year	1992 on
87-1108	—	200 per year	1991-2000
87-1134*	—	260	1989
TOTAL:	1,985		
INACTIVE			
87-1040	300	300	1989
87-1048	50	—	
87-1049	—	700 per year	1989-96
87-1073	800	—	UF_6
87-1114	525	—	
87-1125	390	—	
TOTAL:	2,065		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 1057, 1078, 1113.

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CURRENT MARKET DATA

LOAN SUPPLY AND DEMAND
(October 31, 1987)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
87-1064	600	—	
87-1119	500	—	
TOTAL:	1,100		
INACTIVE			
87-1012	2,000	—	
87-1031	1,000	—	
87-1033	1,000	—	
87-1071	1,000	—	UF_6
TOTAL:	5,000		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 1098.

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CONVERSION SUPPLY AND DEMAND
(October 31, 1987)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UF_6) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale:			
ACTIVE			
87-1122	330	—	
TOTAL:	330	750	
INACTIVE			
87-1008	750	750	
TOTAL:	750		
Inquiries to Purchase:			
ACTIVE			
87-1072	440	—	
87-1132	220	—	
TOTAL:	660		
INACTIVE			
87-1009*	220	—	
TOTAL:	220		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 1084C, 1131.

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CURRENT MARKET DATA

SWU SUPPLY AND DEMAND
(October 31, 1987)

Nuexco Project Number	Delivery Period[1] (Thousands of SWU) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
87-1058*	150	—	1987
87-1068	100	—	1988
87-1096*	300	—	1988
TOTAL:	550		
INACTIVE			
87-1004	55	—	1987
87-1059	25	—	1987
87-1128	300	—	1987
87-1130*	150	—	1989
TOTAL:	530		
Inquiries to Purchase:			
ACTIVE			
87-1100	55	—	1988
87-1116*	100	—	1989
87-1139*	25	—	1989
TOTAL:	180		
INACTIVE			
87-1065	150	—	1988
TOTAL:	150		

*New or revised since last month.
[1]Measured from the date of this Report.
[2] For delivery within one year. This category excludes SWU deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: None.

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RECLAMATION AND STABILIZATION OF URANIUM TAILINGS SITES IN THE USA

Introduction

Until the early 1970s, there were virtually no regulations covering decommissioning and reclamation procedures for uranium production facilities in the USA. Early uranium production projects focused on the economics of uranium (U_3O_8) recovery, and mining was carried out with little regard for the disposal of mined waste rock, especially in open-pit mines where large volumes of material were handled. Mills and tailings ponds usually were placed for convenience to the ore source, as well as for convenient topography and adequate fresh water supply. The adverse effects and consequences of radioactivity on surface and subsurface (ground water) environments, especially long-term effects, were poorly understood.

As technology advanced and the uranium industry's experience increased, the government and the producers increasingly became aware of the environmental problems caused by uranium production activities, especially mill tailings. Studies began in the early 1960s identified the buildup of radioactive elements, including radium, radon and radon daughter products, as potential health and environmental hazards occurring in tailings and in surrounding contaminated areas. Studies by government agencies and private industry have since documented that uranium mining can cause a significant radiological and chemical threat to public health and the environment.

Because of the increased awareness of health hazards associated with uranium mining and milling, government and industry-sponsored regulations now affect virtually all US uranium projects, past and present. Even though regulations may vary somewhat from state to state, the primary concern is the same — containment and stabilization of mill tailings, and preventing their off-site dispersal. Mine reclamation and mill decommissioning are considered less critical issues, although these also are covered by regulations.

Recently-designed projects must operate within the limits of new regulations. One of the most important concerns is

Figure 1. Energy Fuels' White Mesa Uranium Mill, Blanding, Utah.
**All photos courtesy of Energy Fuels Nuclear, Inc.*

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preventing the leakage of tailings solutions into groundwater aquifers. (Figure 2 shows lining material being installed in a tailings containment basin.) All recent projects are designed to minimize downward seepage and to allow prompt stabilization of tailings piles, as well as to optimize cleanup of surface and underground installations when the project closes down. Through careful site selection, design and construction of tailings containment basins, mine operators can achieve virtually total containment of solid waste material and the regulated release of excess liquid waste. Designing these features into newer projects has lessened the negative economic impact of some requirements.

Background

Government support for the US uranium production industry extended from 1942 through 1970; the first four years on behalf of the US Army's Manhattan Engineering District and the remaining period under jurisdiction of the Atomic Energy Commission (AEC). The government's procurement program offered guaranteed prices as well as bonus payments for uranium ore and for U_3O_8. The program expanded rapidly in the 1950s, with literally hundreds of privately-owned and operated mines coming into production throughout 12 western states. By 1960 the industry had become more stable, with 26 privately-owned and operated mills in production. During the period 1948 to 1970, the AEC purchased almost 350 million pounds of U_3O_8 from producers in the USA, more than 80 percent of total production for the period. These purchases required the processing of over 80 million tons of ore, most of which was then deposited as tailings.

Figure 2. Installing synthetic lining material in tailings containment basin, White Mesa Mill.

The AEC uranium procurement contracts covered only the purchase of uranium — the contracts had no provisions for reclamation and decommissioning of mine and mill facilities or for tailings stabilization. However, after government and private sources recognized the potential hazards of tailings piles, remedial action was considered. Congress enacted the first remedial action law in 1972. Subsequent laws (and currently proposed bills) provide for remedial action on all conventional uranium mill tailings piles in the USA. Uranium producers today, faced with large expenditures for reclamation, take the position that not enough of the cost of reclamation is borne by the government, whose demand for uranium in the early days of the industry led to much of the current tailings disposal situation.

Characteristics of Uranium Mill Tailings

Uranium tailings management combines many of the factors found in other non-ferrous mining operations with a radiological component not normally found elsewhere. As a result, efforts to establish regulatory procedures and standards have had to decide whether to treat uranium tailings as a special type of low-level nuclear waste product or as a somewhat unique type of mining waste. The primary constituents in uranium tailings that are a threat to the environment vary widely depending on specific types of ore, but include molybdenum, selenium, vanadium and arsenic — some of the same elements and compounds that are found in many other mining operations.

Newly-milled uranium is not highly radioactive. Most of the radiation in the ore results from the decay over time of uranium radionuclides from the U-238 series, many of which are left in the tailings material rather than in the extracted uranium. Radon-222 and its immediate decay ("daughter") products are, for example, alpha emitters present in uranium tailings and are considered dangerous if inhaled. Because radon is an inert gas, radon-222 is quite mobile and can leave the confines of its uranium ore host.

The pathways by which these hazardous elements or compounds can enter the environment may be quite variable worldwide. However, because the great majority or uranium operations in the USA occur in arid areas of the west or southwest, the dominant processes or pathways are wind erosion, flash flooding, or seepage into groundwater aquifers. (Figures 3 and 4 show fences erected in an effort to prevent movement of windblown tailings material.)

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Figures 3,4. Fences erected to inhibit movement of wind-blown tailings material.

Fortunately, many mill sites (and therefore tailings sites) are located in sparsely-populated areas, and their tailings materials have not posed much of a threat to local populations. In the past, however, some tailings were used as earthfill material in residential construction, presenting unusual and more costly reclamation problems. The highest priority tailings reclamation sites in the USA are not the largest, but are those in close proximity to population centers.

Regulatory Requirements

All US uranium production sites currently are subject to certain regulations, although requirements may differ by county, state and degree of severity. Regulations must be flexible enough to allow their site-specific adaptation, because each project operates (or operated) under different circumstances. Since mill tailings are the main area of concern, design of regulations has focused on that problem, with the necessary modifications for other production methods where applicable, such as solution mining. Regulations that govern tailings generated from by-product uranium production projects, such as are located in the phosphate region of the southeast USA, are equivalent to those pertaining to less hazardous waste materials.

The regulations for conventional production centers cover mine sites and vicinity properties, tailings reclamation, and mill decommissioning. Regulatory responsibility falls under the following government branches:

1. Mine Sites — for active mines, the mine operator is responsible; for abandoned mines, the State has jurisdiction.
2. Mill tailings — primary responsibility is assumed by the NRC, using guidelines established by the Environmental Protection Agency (EPA).
3. Vicinity Properties — under UMTRCA, the Department of Energy (DOE) provides funds and has primary responsibility, with consultation by the Nuclear Regulatory Commission (NRC).
4. Mill decommissioning — the NRC is responsible, with state concurrence.

The Uranium Mill Tailings Radiation Control Act (UMTRCA)

The UMTRCA was not the first uranium mill tailings-related legislation. The first legislation directed toward tailings disposal (Public Law 92-314) was enacted on June 16, 1972. Title II of this bill provided for removal of uranium tailings from private premises and was limited in scope to the cleanup of private properties in the area of Grand Junction, Colorado.

However, passage of the UMTRCA (P.L. 95-604) in November 1978 represented a much more comprehensive approach to tailings management and is the most complete and important law to date covering uranium tailings reclamation and stabilization. The basic intent of the law, under provisions of Title I, is to provide for remedial action work at the 24 inactive tailings sites created during the AEC procurement program (Table1). However, provisions of Title II extended the law's regulatory authority to include remedial actions on active uranium and thorium tailings sites. Also, there are about 8,000 vicinity properties (properties outside the mill property that are contaminated with tailings) that

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Table 1

INACTIVE URANIUM PROCESSING SITES — UMTRA PROGRAM

State	Processing site	Quantity of Tailings (Million tons)[1]	Designated Vicinity Properties	Health Hazard	Planned Completion Date[2]
Arizona	Monument Valley[3]	1.10	17	Low	1991
	Tuba City[3]	0.80	8	Medium	1989
Colorado	Durango	1.55	137	High	1989
	Grand Junction	1.90	6905	High	1991
	Gunnison	0.54	14	High	1990
	Maybell	2.60	**	Low	1991
	Naturita	0.34	60	Medium	1991
	New Rifle	2.70	384	High	1991
	Old Rifle	0.35	—	High	1991
	Slick Rock	0.04	4	Low	1992
	Slick Rock	0.35	—	Low	1992
Idaho	Lowman	0.09	17	Low	1992
New Mexico	Ambrosia Lake	2.60	**	Medium	1989
	Shiprock[3]	1.50	17	High	1986
North Dakota	Belfield	0.05	11	Low	1992
	Bowman	0.07	3	Low	1992
Oregon	Lakeview	0.13	4	Medium	1988
Pennsylvania	Canonsburg	0.41	111	High	1985
Texas	Falls City	2.50	20	Medium	1991
Utah	Green River	0.12	29	Low	1992
	Mexican Hat[3]	2.20	21	Medium	1991
	Salt Lake City	1.88	127	High	1987
Wyoming	Spook	0.19	1	Low	1992
	Riverton	0.90	50	High	1989
	TOTAL:	24.91			

[1]Based on 1986 DOE data.
[2]Based on UMTRCA master schedule (8/86)
[3]Site located on Navajo tribal lands.
**No vicinity properties involved.

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will be reclaimed along with properties listed under Title I and Title II.

Under Title I of the UMTRCA, DOE created and assumed overall responsibility for the Uranium Mill Tailings Remedial Action Program (UMTRAP), the EPA established the standards for the required remedial action work, and the NRC reviews and enforces remedial action plans, and issues a license for surveillance and maintenance of the stabilized site.

In April 1983, DOE and the NRC accepted the EPA's newly-defined standards. The primary standards established for UMTRAP call for:

1. A stable tailings environment for up to 1,000 years, to the extent reasonably achievable and, in all cases, for a minimum of 200 years.

2. Radon emissions (Radon-222) are not to exceed 20 picocuries per square meter per second, and any increase in the annual average concentration of radon in the air at or above any location may not exceed 0.5 picocuries per liter.

3. Existing federal and state regulations governing water (surface and subsurface) protection measures will be used on a site-specific basis. (Note: The Tenth Circuit Court of Appeals remanded the water considerations, requiring the EPA to establish general application standards. Until this is done, DOE has applied an interim plan satisfactory to NRC and state agencies.)

Title I of the UMTRA program was originally scheduled for completion within seven years after the establishment of EPA standards, or March 1990. Due to budget restraints, however, it may be extended to 1993. Figure 5 shows the locations of 23 UMTRAP inactive tailings sites located in the western USA. Not shown is the 24th site, which is located at Canonsburg, Pennsylvania, where the remedial action program was initiated in October 1983.

DOE has full responsibility for the UMTRA program and each state and Indian tribe with abandoned tailings on their lands participates through a Cooperative Agreement with DOE. This agreement establishes rules and procedures for conducting remedial action work on each site. Overall project costs have been estimated at $940 million, of which participating states pay 10 percent and the federal government pays 90 percent (the federal government pays total costs for work on all Indian lands).

Actions Taken Under the Remedial Action Program

The earlier 1972 legislation (P.L. 92-314) provided for removal of uranium tailings from private premises (vicinity properties) in the area of Grand Junction, Colorado. About 2.2 million tons of uranium mill tailings from the AEC buying program are located near Grand Junction, of which approximately 300,000 tons were removed from the tailings pile for use in local construction or landfill projects prior to 1966. The law provided financial assistance to the State of Colorado for the removal of tailings from the public sites; stabilization of the tailings pile was not included. The US government will pay about 75 percent of the estimated $25 million cost, and the state will pay the remaining 25 percent. Although the program is still in progress, it presently falls under provisions of the UMTRCA, and now includes, at additional cost, the tailings pile.

Since 1979, the UMTRA program has undertaken work on six of the 24 inactive sites. A brief description of activities on those sites is listed below:

Canonsburg, Pennsylvania — The Standard Chemical Company produced radium on the 38-acre site from 1911 to 1922; from 1942 to 1957, Vitro Corporation of America reprocessed the tailings to recover radium and uranium salts. Remedial action work began in October 1983. The contractors buried contaminated structures in 400,000 tons of tailings which were stabilized in place, and about 160 vicinity properties were decontaminated. The work was completed in December 1985 at a reported cost of approximately $30 million.

Salt Lake City, Utah — The Vitro Corporation of America produced uranium on the 128-acre site from 1951 through 1964, and vanadium from 1964 to 1968. The mill was dismantled in 1970. Remedial action work began in 1985 and final cleanup is still being completed. All contaminated structures and tailings have been relocated for burial at a carefully prepared site about 85 miles west of Salt Lake City. The work program included over 120 vicinity properties and costs approximately $50 million.

Shiprock, New Mexico — Over two million tons of uranium tailings were created by Kerr-McGee Oil Industries, Inc. from 1954 to 1963, and by the Vanadium Corporation of America from 1963 to 1968. The 230-acre site is situated on land controlled by the Navajo Nation. Contractors stabilized the site's 1.5 million tons (1.3 million cubic yards) of contaminated materials with a six-foot cover of clay, followed by two feet of rock covering, during an 18-month work period, which finished in October 1984. The cleanup included removing windblown tailings from 16 vicinity

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RAW MATERIALS

Figure 5. Locations of UMTRAP Inactive Tailings Sites.

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properties. The $14.7 million cost of the reclamation has been paid entirely by DOE.

Lakeview, Oregon — The Lakeview Mining Company initiated uranium milling in 1958. Milling continued on an irregular schedule under five or six different owners until 1968, when Atlantic Richfield purchased the operation. Altogether, about 400,000 tons of tailings had accumulated on 30 acres of the 258-acre site. Atlantic Richfield decontaminated the mill site in 1974 according to then-existing standards. Remedial action will entail relocating and burial of the tailings and other contaminated materials at a site six miles northeast of the mill site. The cleanup program includes seven vicinity properties. The program began in June 1986 and is scheduled for completion in late 1987.

Durango, Colorado — The mill was built in 1942 to supply vanadium to the US government. The United States Vanadium Corporation reworked the tailings for uranium, and processed newly-mined uranium/vanadium ores from 1943 to 1946 and from 1949 to 1963. The site covers 127 acres and contains two tailings piles. The largest pile covers seven acres and contains about 1,230,000 tons; the small pile contains about 325,000 tons on three acres. Ranchers Exploration and Development Corporation (since acquired by Hecla Mining Company) purchased the site in 1977. All contaminated materials at the site, and from 100 vicinity property locations and 50 windblown acres, will be relocated and buried at a site 3.5 miles from Durango. The remedial action program began in 1986 and is scheduled for completion by 1990, at a cost of approximately $25 million.

Tuba City, Arizona — In 1956, the Rare Metals Corporation of America built a uranium mill on a 105-acre site located on land controlled by the Navajo Nation. The mill operated until 1966 when full control of the site reverted to the Navajo Nation. About 800,000 tons of tailings are located on 22 acres. All contaminated buildings and materials will be buried adjacent to or in the tailings. Phase 1 (demolition of buildings) was completed in 1986; Phase 2 will begin in late 1987 and is scheduled for completion by 1989.

Figure 6. Tailings cell no. 3, White Mesa Mill.

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Work is scheduled to begin soon at the Riverton, Wyoming site of Susquehanna Western, which generated some 1.8 million cubic yards of tailings. Contractor for the project is Landmark Reclamation, a subsidiary of Energy Fuels Nuclear and Umetco Minerals. Tailings material will be relocated to an existing tailings impoundment approximately 55 miles away. Total cost for the project is expected to be over $20 million.

After the Remedial Action Program was underway, problems began to arise concerning the identification of, and payment for tailings material that was created under the early government procurement program. Public Law 96-540 (December 1980), Section 213, provided for the Secretary of Energy to develop a plan for assistance in the stabilization and management of uranium mill tailings accumulated under the AEC procurement program and which are now commingled with tailings from commercial-related operations. There are 13 sites with comingled tailings (Table 2).

As a result of the study conducted for the Secretary of Energy, DOE included the 13 sites with comingled tailings in the category of "licensed" mills and, bringing them under the provisions of UMTRCA requirements outlined in Title II. Thus, the 13 sites with comingled tailings, as well as sites with commercial-only tailings, are in the same category. However, Title II did not provide a method for uranium producers to finance reclamation and remedial action of tailings categorized as comingled or commercial. Due to the retroactive nature of the UMTRCA, producers and mill operators feel that the government, together with utility companies, should pay part of the cost of meeting UMTRCA requirements.

Draft Legislation

In order to provide partial government funding of comingled tailings reclamation, Senator Pete V. Domenici (R-New Mexico) has recently introduced Draft Bill S.1100 in the US Congress.

The bill, entitled Uranium Revitalization, Tailings Reclamation and Enrichment Act of 1987, provides, in part, for financing of all reclamation and remedial action that may take place on all active mill sites. According to the latest version of the bill, financing is to be:

"... shared on an approximately equal basis by owners or licensees of active uranium mills, the Federal government, and the owners or licensees of civilian nuclear power reactors, with support from the states in which the active sites are located."

Title II of Domenici's bill calls for the establishment of a Uranium Mill Tailings Fund, to be used to pay for UMTRCA-required reclamation at qualified mill sites. A mill site would be "qualified" if it is listed in Title II of the bill and if the owner or licensee agrees to participate in the draft bill's funding program. The Fund would have three groups of contributors — the mill site owners or licensees, DOE, and utility company licensees of civilian power reactors.

Mill owners or licensees would have to pay a flat fee of $2 million per site for tailings reclamation, as well as $500,000 for any mill decommissioning. In addition, producrs would be assessed a fee of $1.00 per dry ton of tailings produced for commercial sale after the bill's effective date, if it is passed into law. The federal government would pay $300 million into the Fund, and civilian reactor licensees would pay $22.00 per kgU contained in the reactor fuel elements loaded into their reactors in the years 1989 to 1993. Upon passage of the Draft Bill, the Treasury Department would establish the Uranium Mill Tailings Fund, with payments to mill owners beginning shortly after.

Reimbursements paid to mill owners or licensees would be limited to payments of less than $4.50 per dry ton of tailings, and any payment into the fund by a mill owner of more than one-third of the total site reclamation cost would be refunded to that contributor. Reclamation of tailings generated after the proposed bill would take effect, would not be covered under the program, and operators costs would be calculated on a site-by-site basis.

The bill lists 26 active sites that qualify for reimbursement of remedial action work, including the 13 sites with commingled tailings and the 13 sites with commercial-related tailings. Combined, the 26 sites contain an estimated 194 million tons of tailings. Total reclamation costs for the project are uncertain because technical evaluation is still in progress. There is no set time schedule for project startup for the same reason. Although the draft bill has passed through the Senate Energy Committee, strong opposition exists both in the Senate and House of Representatives, and many observers believe that the bill's chances of passage are not good.

Conclusion

Since the early 1970s, solving the problems of how to safely stabilize and handle uranium tailings from both the early AEC procurement program and from commercial

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Table 2

ACTIVE URANIUM MILL SITES IN THE USA INCLUDED IN THE PROVISIONS OF UMTRCA

State	Mill	Company	Location	Quantity of Tailings (1,000 tons)	Status
Mills with Commercial-related tailings only:					
Colorado	Maybell[1]	UMETCO	Maybell	2,000	Inactive
New Mexico	Churchrock	UNC Resources	Churchrock	3,500	D/R[2] in progress
	L-Bar	Kennecott	Seboyeta	2,100	D/R in progress
Texas	Panna Maria	Chevron Resources	Hobson	4,600	Operating
	Conquista[3]	Conoco/Pioneer Nuc.	Falls City	8,800	D/R, final stage
	Felder	Exxon Nuclear Co.	Three Rivers	400	D/R, final stage
Utah	Lisbon	Rio Algom Corp.	La Sal	3,000	Operating
	White Mesa	Energy Fuels, UMETCO	Blanding	1,900	Operating
Washington	Sherwood	Western Nuclear	Wellpinit	2,900	Standby[4]
Wyoming	Highland	Exxon Nuclear Co.	Douglas	7,200	D/R, final stage
	Bear Creek	Rocky Mtn. Energy	Douglas	5,000	D/R, in progress
	Shirley Basin	Pathfinder Mines	Shirley Basin	6,300	Operating
	Sweetwater	Minerals Exploration	Red Desert	1,000	Standby
			TOTAL:	48,700	
Mills with comingled Tailings - AEC and commercial-related:					
Colorado	Cotter	Cotter Corp.	Canon City	2,200	Standby
	Uravan	UMETCO	Uravan	10,300	Standby
New Mexico	Bluewater	ARCO	Bluewater	23,600	Inactive[5]
	Quivira	Quivira Mining Co.	Ambrosia Lake	33,000	Standby
	Homestake	Homestake Mining Co.	Grants	21,800	Operating
South Dakota	Edgemont[6]	Tennessee Valley Auth.	Edgemont	2,000	D/R, in progress
Utah	Atlas	Atlas Minerals Corp.	Moab	10,500	Standby
Washington	Dawn	Newmont Mining Co.	Ford	3,000	Standby
Wyoming	ANC	American Nuclear	Gas Hills	5,900	Standby
	Lucky Mc	Pathfinder Mines	Gas Hills	9,500	Operating
	Petrotomics	Texaco	Shirley Basin	6,300	D/R, final stage
	East Gas Hills	UMETCO	Gas Hills	9,200	Standby
	Split Rock	Western Nuclear, Inc.	Jeffrey City	7,700	Inactive
			TOTAL:	145,000	

[1]UMETCO's heap leach site, not to be confused with tailings site No. 8 on Figure 5.
[2]D/R = decommissioning of mill and reclamation of mill area, including tailings pile and aquifer evaluation, any one of which may be in various stages of completion.
[3]Conquista decommissioning and reclamation complete except for a portion of the tailings pile used as a state low-level waste depository.
[4]Standby refers to mills that may operate in the future.
[5]Inactive refers to mills that will not operate again and are considered for decommissioning.
[6]Mill decommissioning and tailings removal for burial in progress by TVA.

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uranium mining and milling has depended on several legislative actions. The most comprehensive of these is the UMTRCA, enacted in 1972, which has regulations covering the now inactive tailings sites as well as active ones.

Under the UMTRCA, and its remedial action program (UMTRAP), 24 inactive tailings sites, including over 8,000 vicinity properties that have since become contaminated with tailings material, are scheduled for cleanup, most of the cost of which is being paid for by the federal government. Separate but related regulations cover mill sites and tailings areas considered active, some of which have tailings generated earlier during the era of government procurement and which are comingled with commercially-produced tailings.

Many uranium producers in the USA feel that they should not be asked to pay the considerable sums necessary for tailings stabilization, when at the time many of the tailings were generated few or no regulations existed controlling tailings disposal. At present, only part of the expense for tailings reclamation is paid by the federal and state governments, while the bulk of it must be paid by the uranium producers. Senator Pete V. Domenici of New Mexico has sponsored several draft bills in Congress that deal with, among several other nuclear industry-related issues, tailings disposal and reclamation. Although the latest version of this proposed legislation faces considerable opposition in Congress, its passage could lead to a new fund that would help defray the costs to producers of the extensive reclamation necessary to comply with the current regulations. In the meantime, US uranium tailings sites, both inactive and active, are undergoing continuing remedial action and tailings stabilization.

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AUSTRALIA

There has recently been considerable evidence that Australia's posture in the uranium industry is changing, despite what Australian spokesmen (government as well as corporate) have been prepared to admit. Although statements to the contrary were heard as recently as mid-1987, Australia and Australians now appear to be taking a more aggressive stance in the world uranium market.

It is ironic that this change in outlook is taking place under an administration that, for years as the opposition party, totally opposed all uranium development. However, practical economic and political considerations such as export earnings, taxes, employment and social programs appear to be overcoming the Australian Labor Party's historic opposition to uranium production. These factors, together with the political embarrassment associated with any policy reversal, help explain the often contradictory and uneven fashion in which this movement has proceeded, as well as the general industry sense that Australia was saying one thing and doing another. The principal changes involve the "three-mine" policy and the floor-price policy.

The "three-mine" policy refers to the Labor Party's decision to limit the number of uranium production facilities. The first two mines were the already-committed Ranger and Nabarlek projects in the Northern Territory. What Labor had originally envisioned as a "two-mine" policy was expanded to three when it became politically and economically important to support South Australia's desire to go forward with the Olympic Dam project.

A convenient justification was found in Olympic Dam's status as a "multi-mineral" project and not just another uranium mine. Now, with about 50 percent of Olympic Dam's initial uranium production under contract, there are indications that the government's attitude towards further uranium development may be softening even more. Mr. Kerin, the Minister for Primary Industries and Energy, recently noted that he was unhappy with the arbitrary nature of the three-mine policy, and would support additional uranium mining against objections that were purely ideological.

At the same time, in a paper delivered to the Uranium Institute in September 1987, CRA's Peter Bradfield appears to suggest that additional Australian uranium development could be warranted if it didn't overwhelm utility requirements. In addition, ERA's Canning Resources unit has begun an aggressive pre-marketing campaign to interest potential customers in its Kintyre deposit in Western Australia. While details on Kintyre have not yet been officially made public, it is reliably reported as being shallow, relatively high grade, and large (60 million pounds U_3O_8 proved and still open). With its politically-desirable and remote location in Western Australia and its presumed low cost of production, Kintyre must be viewed as a candidate to be the next Australian uranium project, unless delayed due to aboriginal or environmental problems in the Rudall River National Park area.

However, some observers believe that Jabiluka, Pancontinental's long-delayed Northern Territory project, will be Australia's next uranium production site. In support of Jabiluka, they note that:

1. Aboriginal, royalty and environmental problems are close to being sorted out;

2. With Nabarlek phasing down, Northern Territory authorities are very keen for a new project that can utilize and build on the existing infrastructure; and

3. The Australian penchant for fair play suggests that Pancontinental should have its turn, particularly after standing by for so long after having been denied its chance when Labor first came to power and decided against all new projects except Olympic Dam.

One possible scenario that appears to minimize potential negative political exposure involves using the existing Nabarlek mill to process high-grade ore from a new mine, and allowing Kintyre to begin a modest-sized operation in the West. Political rhetoric aside, the demise of the "three-mine" policy seems only a matter of time.

The Australian government's most visible and continuing involvement with uranium commerce has been its floor-price policy. Predictions that the government would have to agree to prices below the current floor-policy level appear either to have been realized or are close to realization. The Bradfield paper notes that:

— "the floor price should be the subject of constant review."

— "there has been a tendency for it to move lower" over the past year; and

— "the government may consider lowering the floor price even further, with the possibility of its being lifted completely within the next few years."

In view of a history of discussing the floor price in only the most guarded language, the almost casual tone of the Bradfield commentary is rather remarkable and clearly indicates that the floor price is not the inviolate barrier it

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once was. His remarks also help clarify the apparent conflict between what Australians have said (or were obliged to say) about certain recent contracts, and what the buyers have said about those same contracts.

Specific terms and conditions of contracts with Australian producers are not generally available, and much has to be inferred from the identity and known predilections of existing customers. It is clear that the Australian government, prodded by the country's current and would-be producers, is becoming more responsive to current market realities and is taking the steps necessary to prepare for industry expansion and to maintain a competitive position among world suppliers, particularly as regards Canada.

This "new" Australian outlook is coming into focus just as the US market situation is becoming more confused as a result of potential import-limiting legislation, the pending court case between the US producers and DOE, and, most recently, the announced Fair Trade Agreement between the USA and Canada. It is clear that a US-Canada trade agreement, coupled with an import embargo resulting from a victory by the US producers in their lawsuit against DOE, would be a commercial disaster for Australian marketing efforts in the USA. (It should be recalled that Judge Carrigan's original order included no grandfathering provisions with respect to existing contracts.) Other than through a program of origin swaps, it is not clear how the Australian producers could circumvent such a situation, were it to develop, and marketing in the USA would be difficult at best.

SOUTH AFRICA

Third-quarter uranium production from Chamber of Mines producers totaled 2,184,000 pounds U_3O_8, declining 14.5 percent from the second quarter of 1987 (Table 3). The largest drops in output came from Randfontein (a 50-percent drop) and Vaal Reefs (a 21-percent drop). Production from Randfontein has undergone a 58-percent drop since the fourth quarter of 1986, largely the result of strikes and labor disruptions and the mineworkers' strike in August particularly affected both Randfontein and Vaal Reefs. Only three producers increased production in the third quarter.

Table 3
REPUBLIC OF SOUTH AFRICA
RECENT URANIUM PRODUCTION[1]
(Thousands of Pounds U_3O_8)

Third Quarter Operation	Fourth Quarter 1986	First Quarter 1986	Second Quarter 1987	Third Quarter 1987	Percent Change[2]
Buffelsfontein	302	271	245	240	— 2.0
Driefontein Consolidated	43	41	41	42	+ 2.4
ERGO[3]	86	88	79	85	— 9.0
Freegold[4]	266	275	245	223	+ 7.6
Harmony	116	102	103	97	— 5.8
Hartebeestfontein	257	242	231	223	— 3.5
Randfontein	356	314	297	148	— 50.2
Stilfontein (Chemwes)	226	228	234	232	— 0.9
Vaal Reefs	997	1,025	977	768	— 21.4
Western Areas	133	127	104	124	+ 19.2
TOTAL[5]	2,782	2,714	2,555	2,184	— 14.5

[1]Excludes Palabora Mining Company, which is not a member of the Chamber of Mines.
[2]Change in percent from the second quarter of 1987.
[3]ERGO = East Rand Gold and Uranium Company Ltd.
[4]Formerly Free State Joint Metallurgical Scheme.
[5]Columns may not add due to rounding.

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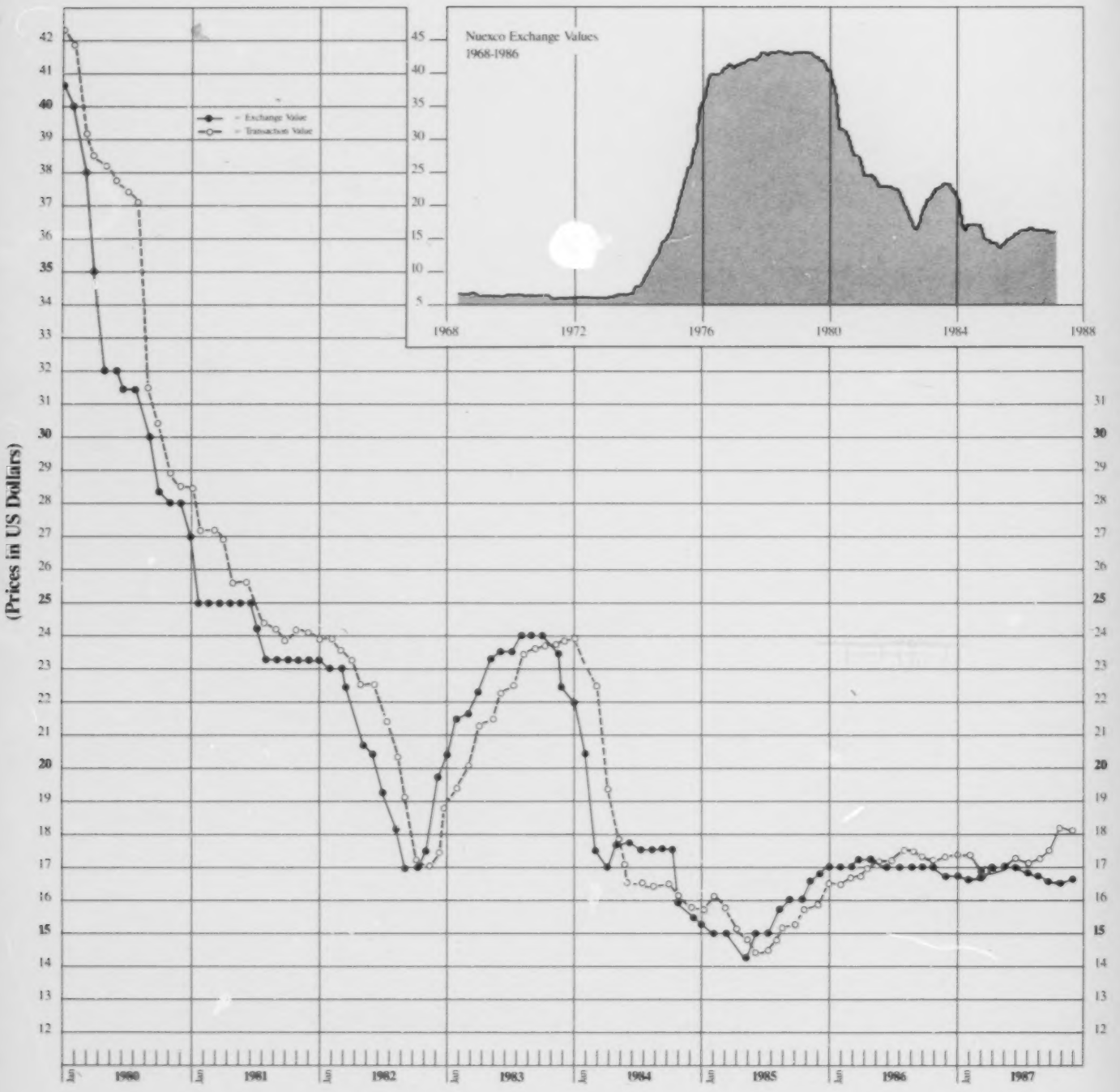
Nuexco Exchange Values
1968-1986
1968
1972
1976
1980
1984
1988
Exchange Value
Transaction Value
(Prices in US Dollars)
Jan 1980
Jan 1981
Jan 1982
Jan 1983
Jan 1984
Jan 1985
Jan 1986
Jan 1987

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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969		6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	**16.75**		

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.30	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.05	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	**18.05**		

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HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	**1.90**		

HISTORICAL UF_6 VALUES

Determined as of the last day of the month indicated (US Dollars/kg. U in UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	**47.00**		

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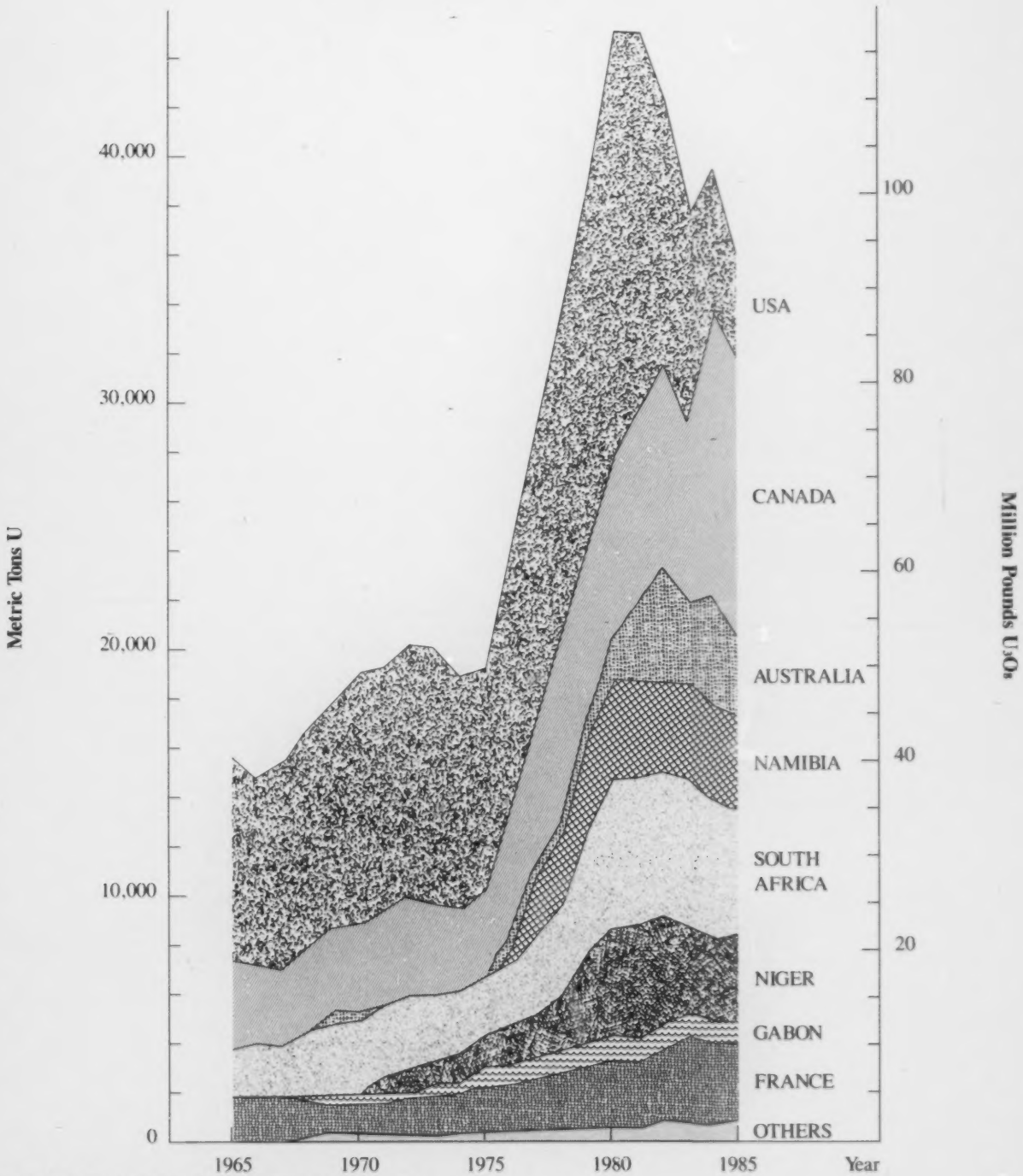
HISTORICAL MARKET DATA

HISTORICAL WOCA[1] URANIUM PRODUCTION[2]
(Compiled by OECD/IAEA Joint Report[3])



[1]WOCA = World Outside of Centrally-planned Economic Areas.

[2]1985 production data are preliminary.

[3]A joint report issued biennially by the OECD Nuclear Energy Agency and the International Atomic Energy Agency.

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US URANIUM MARKETING ACTIVITIES STATISTICS[1]
(Compiled from data published by the US Energy Information Administration)

Year	Total Production[2] (million pounds U_3O_8)	Deliveries to Domestic Utilities[3] (million pounds U_3O_8)	Average Price of Delivered Uranium ($/lb. U_3O_8)	Quantity of Uranium Imported[4] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	n/a	n/a	3.6	n/a	1.2
1977	29.9	n/a	n/a	5.6	n/a	4.0
1978	37.0	n/a	n/a	5.2	n/a	6.8
1979	37.5	33.0[5]	$23.85[5]	3.0	n/a	6.2
1980	43.7	35.0[5]	$28.15[5]	3.6	$43.10	5.8
1981	38.5	32.6[5]	$34.65[5]	6.6	$32.90	4.4
1982	26.9	27.1	$38.37	17.1	$27.23[6]	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3
1986	13.5	18.9	$30.01	13.5	$20.07	1.6

[1]Sources: 1979: US Department of Energy, Assistant Secretary for Resource Applications, Office of Uranium Rresources and Enrichment, *Survey of United States Uranium Marketing Activity*, DOE/RA-0053 (Washington DC, July 1980). 1980-1981: US Department of Energy, ASsistant Secretary for Nuclear Energy, Office of Uranium Enrichment and Assessment, *Survey of United States Marketing Activity*, DOE/NE-0013 and DOE/NE-0013/1 (Washington DC, June 1981 and July 1982). 1982: Energy Information Administration, *1982 Survey of United States Marketing Activity*, DOE/EIA-0403 (Washington DC, September 1983). 1983: Energy Information Administration, *Survey of United States Marketing Activity 1983*, DOE/EIA-0403(83) (Washington DC, August 1984). 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[2]Sources: 1976-11982: US Department of Energy, Grand Junction Area Office, *Statistical Data of the Uranium Industry*, GJO-100 (Grand Junction, Colorado, January 1983). 1983: Calculated by the staff of the Nuclear and Alternate Fuels Division, Office of Coal, Nuclear, Electric and Alternate Fuels, Energy Information Administration, from US Department of Energy, Grand Junction Area Office data files. 1984: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1984). 1985: Energy Information Administration, Form EIA-858, "Uranium Industry Annual Survey" (1985).

[3]Excludes direct imports by domestic utilities.

[4]Includes imports by domestic utilities and domestic suppliers.

[5]Includes delivery commitments to domestic utilities and agents.

[6]Computation of quantity-weighted average price excludes the quantity associated with a large exchange (swap) transaction that occurred in 1982.

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HISTORICAL MARKET DATA

VOLUME AND PRICE OF URANIUM DELIVERIES TO THE EUROPEAN COMMUNITY[1]
(Compiled from data published by the Euratom Supply Agency)

Year	Volume of Deliveries to the EC[2] (in MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts[3,4]		Spot Contracts[3,4]	
			Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8	Average Price in ECU per pound U_3O_8	Average Price in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00
1986	12,000	9.5	ECU 31.50	$31.00	ECU 18.00	$17.75

[1]The twelve European Community member nations are Belgium, Denmark, France, the Federal Republic of Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

[2]The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

[3]For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar.

[4]Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

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AUSTRALIA

		Consumer Price Index[1]	Price Index of Materials Used in Manufacturing Industry — All Groups[2]	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates[3] (1976=100)
1975	Avg.	57.9	150.4	132.6
1976	Avg.	65.7	168.4	160.9
1977	Avg.	73.8	192.0	179.0
1978	Avg.[4,5]	79.7	198.5	190.0
1979	Avg.	86.9	248.8	127.9
1980	Avg.	95.8	321.8	140.8
1981	Avg.	105.0	355.3	154.1
1982	Avg.[6]	116.7	368.6	174.9
1983	Avg.	128.5	401.6	181.9
1984	Avg.	133.6	95.3	194.4
1985	Avg.	142.6	100.0	202.7
1986	Avg.	155.5	105.0	212.9
Jan	1986	—	109.5	210.0
Feb	1986	—	108.7	210.0
Mar	1986	150.5	99.4	210.5
Apr	1986	—	94.2	210.5
May	1986	—	93.5	210.5
Jun	1986	153.0	95.6	210.5
Jul	1986	—	97.8R	215.3
Aug	1986	—	98.9R	215.3
Sep	1986	157.0	105.4R	215.3
Oct	1986	—	105.9R	215.4
Nov	1986	—	104.9R	215.6
Dec	1986	161.5	105.2R	215.6
Jan	1987	—	106.2R	215.9R
Feb	1987	—	108.9R	216.5
Mar	1987	164.7	108.4R	222.2R
Apr	1987	—	108.3R	222.0R
May	1987	—	108.1R	221.8R
June	1987	—	108.1R	221.1R
July	1987	—	—	222.3R
Aug	1987	—	—	223.1

P = Preliminary R = Revised since last month

[1]Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: year 1980-81=100.0). Index periods are for normal calandar years; figures shown at tnd of year represent yearly average; figures shown at end of quarter represent quarterly average.

[2]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0). The basis of this index was revised to 1984 = 100. the previous index was 1969 = 100.

[3]Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.

[4]Annual Averages are for financial year ending June 30.

[5]Monthly data for 1970-78 appear on pages 4.7 and 4.8 of Report 138.

[6]Monthly data for 1979-82 appear on page 35 of Report 184.

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GOVERNMENT STATISTICS

CANADA

		Industry Products Price Index: All Commodities[1] (1981 = 100)	Wage-earner Data: Average Hourly Earnings (C$)[2] Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Primary Non-Ferrous Metal Industries[4] (SIC 296)	(SIC 298)	Chemicals and Chemical Products[5] (SIC 372-379)
1979	Avg.[6]	217.9	—	9.60	9.66	—	—	7.67
1980	Avg.	247.2	—	10.58	10.80	—	—	8.50
1981	Avg.	288.7	—	12.02	12.23	—	—	9.53
1982	Avg.[7]	288.8	—	13.74	13.92	—	—	10.63
1983	Avg.	298.8	—	—	14.30	—	—	11.17
1984	Avg.	310.9	17.88	—	—	—	—	—
1985	Avg.	118.58	18.52	16.37	15.65	12.75	11.19	12.20
Jan	1986	121.0	18.15	16.22	15.86	13.11	11.48	12.52
Feb	1986	120.8	19.52	16.57	15.99	13.20	11.59	12.45
Mar	1986	120.1	19.04	16.65	15.93	13.11	11.59	12.54
Apr	1986	119.3	19.38	16.68	15.95	13.07	11.64	12.54
May	1986	118.4	19.54	16.68	15.78	13.16	11.72	12.51
Jun	1986	118.6	19.80	16.63	15.64	13.44	11.86	12.49
Jul	1986	118.8	19.51	16.34	15.48	13.28	11.73	12.52
Aug	1986	119.1	18.39	16.17	15.46	13.31	11.31	12.70
Sep	1986	119.4	19.32	16.62	15.78	13.14	11.45	12.90
Oct	1986	119.9	19.97	16.81	16.11	13.30	11.59	12.94
Nov	1986	119.9	20.11	17.01	16.24	13.42	11.66	12.93
Dec	1986	119.7	19.67	16.79	16.19	13.06	11.57	12.99
Jan	1987	120.0	19.53	16.93	16.01	13.06	12.58	12.89
Feb	1987	119.8	20.33	17.20	16.21	13.01	12.66	13.11
Mar	1986	120.4R	20.04	17.14	16.15	13.57	12.58	13.02
Apr	1987	121.2R	20.47	17.38	16.26	13.75	11.99	13.27
May	1987	122.1R	20.50	17.12	15.96	14.23	11.44	13.19
June	1987	122.5	20.23	16.94	15.70	13.65	12.77	12.88
July	1987	123.1	19.75R	16.73R	15.63R	13.90R	12.52R	12.98R
Aug	1987	123.7	20.12P	16.88P	15.80P	13.22P	12.69P	12.95P
Sep	1987	124.0	—	—	—	—	—	—

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Index prior to 1985, 1971 = 100.

[2]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours" (3Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)"Æ Beginning with the March 1983 figure, Wage Earner Data are based on a census of all companies employing 200 or more wage earners, plus a random survey of companies employing fewer than 200 wage earners. Prior to March 1983 only companies employing 200 or more wage earners are included in the Wage Earner Data. Wage Earner Data were further revised in January 1987 and now reflect a slightly different base than previously.

[3]Reports 175 through 185 list this series title incorrectly as "Metal Mining, Including Milling (SIC 050-099)."

[4]Beginning with the April 1983 figure, Primary Metal Industries, non-ferrous is split into SIC 296 and SIC 298.

[5]Chemical and Chemical Products prior to April 1983 was SIC 370-379. The new series is from a new survey which includes all companies and is based on a 1970 classification. The old survey only included companies of 20 employees or more.

[6]Monthly ISPI data for 1977 and 1978 appear on page 4.10 of Report 138, and monthly wage-earner data for 1973-78 appear on page 4.11 of Report 138.

[7]Monthly data for 1979-1982 appear on page 37 of Report 184. On that page, the wage earner index entitled "Metal Mining, Including Milling (SIC 050-099)" should read "Total Mining (SIC 051-099)".

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GOVERNMENT STATISTICS

REPUBLIC OF SOUTH AFRICA

		Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982 = 100)[2]	Consumer Price Index[3] (1980 = 100)[4]	Producer Price Index All Groups[5] (1980 = 100)	Total Employment in Mining and Quarrying (Code 35)[6]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[6]
1975	Avg.	16.71	—	157.2	100.0	639,473	1,003,617
1976	Avg.	19.30	—	174.7	115.1	671,240	1,212,983
1977	Avg.	23.87	—	194.4	130.0	712,006	1,420,670
1978	Avg.[7]	27.14	—	137.2	142.7	664,571	1,537,169
1979	Avg.	30.18	—	155.3	164.5	692,209	1,830,632
1980	Avg.[8]	35.53	—	176.7	192.1	714,379	2,279,615
1981	Avg.	41.89	—	206.5	218.3	728,506	2,820,505
1982	Avg.[9]	47.25	104.2	233.5	248.7	707,552	3,246,071
1983	Avg.	51.88	115.0	262.2	274.8	696,579	3,644,772
1984	Avg.	58.95	130.3	292.8	297.9	712,080	4,196,764
1985	Avg.	68.76	151.68	192.6	181.2	726,804	396,956
Jan	1986	—	—	213.8	203.6	744,070	449,513
Feb	1986	—		215.8	206.9	754,458	438,562
Mar	1986	75.76	167.8	218.3	206.9	759,897	445,387
Apr	1986	—	—	222.2	208.9	756,388	437,563
May	1986	—	—	222.6	212.5	754,788	425,544
Jun	1986	77.65	172.0	224.4	213.3	756,637	462,365
Jul	1986	—	—	228.8	216.3	756,140	516,832
Aug	1986	—	—	232.2	220.3	760,929	502,968
Sep	1986	81.94	181.8	236.7	221.9	765,772	511,363
Oct	1986	—	—	239.3	226.8	763,953	512,897
Nov	1986	—	—	242.4	230.2	761,325	531,509
Dec	1986	85.38	189.9	244.9	232.1	752,264	536,970
Jan	1987	—	—	248.3	233.9	740,031	532,577
Feb	1987	—	—	251.0	237.0	757,872	598,986
Mar	1987	88.17	197.1	255.0	239.6	762,697	536,006
Apr	1987	—	—	258.2	242.5	761,850	533,487
May	1987	—	—	261.2	243.6	759,428R	530,981
Jun	1987	90.74	203.5	263.1	244.9	759,433	573,546
July	1987	—	—	266.2	246.8	—	—
Aug	1987	—	—	270.0	249.9	—	—
Sep	1987	—	—	273.4	—	—	—

P = Preliminary R = Revised since last month

[1]Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly.

[2]Page 16 of Report 178 contains description and calculation of index, and page 24 of Report 178 lists figures for 1982.

[3]Republic of South Africa Department of Statistics, Pretoria: "Government Gazette: Consumer Price Index for Urban Areas."

[4]The basis for calculation prior to January 1985, 1975 = 100. For annual averages prior to 1978, April 1970 = 100.

[5]Previously known as the Wholesale Price Index, now the Producer Price Index. The computation remains the same. The basis for calculation prior to January 1985, 1975 = 100.

[6]Bulletin of Statistics, Department of Statistics, Pretoria.

[7]Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Report 140.

[8]Monthly data for Codes 35 and 40, 1977-1980, appear on page 28 of Report 157

[9]Monthly data for 1979-82 appear on page 39 of Report 184.

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GOVERNMENT STATISTICS

UNITED STATES

		Producer Price Index[1]		Consumer Price Index[2] (1967 = 100)	GNP Implicit Price Deflator[3,4] (1982 = 100)	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[5]			
		Industrial Commodities (1967 = 100)	All Commodities (1967 = 100)			Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.[6]	274.8	268.8	246.8	85.7	10.26	10.63	8.30	6.94
1981	Avg.	304.1	293.4	272.4	94.0	11.55	11.98	9.12	7.62
1982	Avg.[7]	312.3	299.3	289.1	100.0	12.31	12.93	9.96	8.21
1983	Avg.	315.7	303.1	298.4	103.9	12.58	13.43	10.59	8.65
1984	Avg.	322.6	310.3	311.1	107.7	13.05	13.43	11.08	9.04
1985	Avg.	323.8	308.7	322.2	111.2	13.38	13.74	11.56	9.46
1986	Avg.	312.2	299.8	328.4	114.1	13.20	13.49	11.98	9.65
Jan	1986	323.8	308.9	328.4	—	13.41	13.68	11.87	9.58
Feb	1986	318.9	304.4	327.5	—	13.46	13.80	11.83	9.57
Mar	1986	314.0	300.3	326.0	112.9	13.41	13.91	11.80	9.60
Apr	1986	311.6	298.2	325.3	—	13.47	13.89	11.84	9.60
May	1986	311.6	299.2	326.3	—	13.40	13.79	11.90	9.63
Jun	1986	311.8	299.0	327.9	113.7	13.50	13.50	11.95	9.59
Jul	1986	308.5	297.4	328.0	—	13.33	13.30	12.05	9.67
Aug	1986	307.9	297.2	328.6	—	12.96	13.13		9.64
Sep	1986	308.7	297.5	330.2	114.7	13.04	13.28	12.03	9.70
Oct	1986	309.6	298.4	330.5	—	12.85	13.16	12.08	9.67
Nov	1986	309.8	298.7	330.8	—	12.75	13.14	12.17	9.73
Dec	1986	309.8	298.1	331.1	114.9	12.70	13.03	12.20	9.82
Jan	1987	313.5	300.9	333.1	—	12.94	12.98	12.18	9.84
Feb	1987	314.9	302.2	334.4	—	12.99	12.83	12.21	9.84
Mar	1987	315.7	302.7	335.9	116.1	13.04	12.79	12.24	9.84
Apr	1987	317.3	305.0	337.7	—	13.16	12.90	12.30	9.82
May	1987	318.3R	307.1R	338.7	—	12.97	12.92	12.31	9.83
Jun	1987	320.2	308.5	340.1	117.2	13.05	12.93	12.27	9.84
Jul	1987	322.6	310.2	340.8	—	13.06R	13.07R	12.37R	9.89
Aug	1987	323.8	310.5	342.7	—	13.06P	13.07P	12.32R	9.90R
Sep	1987	323.3	310.4	344.4	117.8	—	—	12.57P	9.96P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2]US Bureau of Labor Statistics, Washington, D.C.: Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3]US Department of Commerce, Washington, D.C.: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4]The basis for calculation of this index was revised to 1982 = 100. 1984 and 1985 figures have been adjusted to that basis. The basis for calculation prior to 1984, 1972 = 100.

[5]US Bureau of Labor Statistics, Washington, D.C.: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[6]Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28 and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Report 139. Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Report 147. Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Report 154. Monthly Data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

[7]Monthly data 1979-1982 for all listed indices appear on page 41 of Report 184.

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